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## Christchurch City Council SUPPLEMENTARY AGENDA

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### Notice of Meeting:

An ordinary meeting of the Christchurch City Council will be held on:

**Date:** Thursday 28 February 2019  
**Time:** 9.30am  
**Venue:** Council Chambers, Civic Offices,  
53 Hereford Street, Christchurch

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### Membership

Chairperson	Mayor Lianne Dalziel
Deputy Chairperson	Deputy Mayor Andrew Turner
Members	Councillor Vicki Buck
	Councillor Jimmy Chen
	Councillor Phil Clearwater
	Councillor Pauline Cotter
	Councillor Mike Davidson
	Councillor David East
	Councillor Anne Galloway
	Councillor Jamie Gough
	Councillor Yani Johanson
	Councillor Aaron Keown
	Councillor Glenn Livingstone
	Councillor Raf Manji
	Councillor Tim Scandrett
	Councillor Deon Swiggs
	Councillor Sara Templeton

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**26 February 2019**

### Principal Advisor

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Chief Executive  
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Committee and Hearings Advisor  
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Note: The reports contained within this agenda are for consideration and should not be construed as Council policy unless and until adopted. If you require further information relating to any reports, please contact the person named on the report.

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## 23. Resolution to Include Supplementary Reports

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### 1. Background

- 1.1 Approval is sought to submit the following report to the Council meeting on 28 February 2019:
  24. Water Supply Improvement Programme - update
- 1.2 The reason, in terms of section 46A(7) of the Local Government Official Information and Meetings Act 1987, why the report was not included on the main agenda is that it was not available at the time the agenda was prepared.
- 1.3 It is appropriate that the Council receive the report at the current meeting.

### 2. Recommendation

- 2.1 That the report be received and considered at the Council meeting on 28 February 2019.
  24. Water Supply Improvement Programme - update

## 24. Water Supply Improvement Programme - update

Reference: 19/147434

Presenter(s): Helen Beaumont - Water Supply Improvement Programme Manager

### 1. Purpose and Origin of Report

#### Purpose of Report

- 1.1 The purpose of this report is for the Council to be informed as to the progress of the water supply improvement programme and to consider the timing of and criteria for the removal of the temporary chlorination.

#### Origin of Report

- 1.2 This report is being provided update Council on progress with respect to the Council resolutions of January and April 2018 on temporary chlorination and well head security; and to fulfil Council resolution CNCL/2018/00248 of 25 October 2018:

*Request that staff report back before the end of 2018 on the implications of terminating the temporary chlorination programme at the end of the twelve month timeframe previously agreed by Council.*

- 1.3 By agreement between the Mayor and the Chief Executive this report back was deferred until February 2019 when the forward work programme could be confirmed.

### 2. Significance

- 2.1.1 The decision in this report is of low significance in relation to the Christchurch City Council's Significance and Engagement Policy.

### 3. Staff Recommendations

That the Council:

1. Notes the progress with the well head remediation programme and the timetable for the removal of temporary chlorine treatment with approximately 90 per cent of the water supply delivered from secure wells, and consequentially chlorine free, by May 2019; and 100 per cent of the water supply chlorine free by October 2019.
2. Approve the introduction of water restrictions for Christchurch city, from March to May 2019, to support the timely delivery of the well head remediation works.

### 4. Key Points

- 4.1 Temporary chlorination of the city's water supply was rolled out across 50 pump stations between March and May 2018.
- 4.2 A programme to accelerate the upgrade of the well heads across the city commenced in February 2018. To date 39 out of 140 wells have been upgraded and signed off as secure.
- 4.3 Chlorine treatment is discontinued at a pump station when the upgrade works are completed on the associated wells. To date nine pump stations are fed by only secure wells and do not require chlorine treatment, and four pump stations are able to operate without chlorine at times of low demand (when the insecure wells can be isolated from the network).

- 4.4 The indicative timetable for the upgrade of the well heads, and consequential dates for the removal of chlorine from each pump station, would see approximately 90 per cent of the water delivered without chlorine disinfection by the end of May 2019.
- 4.5 The installation and commissioning of ultraviolet treatment at Main Pumps is timetabled for the end of June 2019 and would see 95 per cent of the water delivered without chlorine treatment.
- 4.6 Following further well head remediation works over the winter 100 per cent of the water would be able to be delivered without chlorine disinfection by October 2019.
- 4.7 Council staff are continuing to work closely with contractors to accelerate delivery where possible.
- 4.8 The introduction of water restrictions for Christchurch city would provide greater certainty of delivery on the well head remediation timetable and may allow a larger number of wells to be made secure by May 2019.

## 5. Context/Background

### Christchurch water supply and 'secure' status

- 5.1 The water supply for the city is sourced entirely from groundwater with 140 operating wells, feeding into 53 pump stations.
- 5.2 The Christchurch city supply, except for the Northwest supply zone, was considered to be secure and comply with the Drinking Water Standards New Zealand (Standards) up until the 2011 earthquakes; following the earthquakes it had 'provisionally secure' status. To be deemed secure, and avoid disinfection treatment under the current Standards, three bore water security criteria need to be met:
  1. The bore water must not be directly affected by surface or climatic influences
  2. The well head must provide satisfactory protection
  3. *Escherichia coli* must be absent from the bore water.
- 5.3 The well heads are inspected every five years to assess compliance with Criterion 2 and consider any opportunities for improvements. In 2017 engineering consultants, PDP and BECA, inspected two groups of well heads and made a number of recommendations for improvements, before the well heads could be considered to be secure. The failure to be considered secure was mostly due to a stricter interpretation of the standards, following the contamination of the Havelock North supply, rather than a significant deterioration in the infrastructure at the well head.
- 5.4 Temporary chlorination of the Christchurch city water supply was implemented between March and May 2018 in response to advice from the Drinking Water Assessor that the supply was not considered secure from possible contamination as the well heads did not meet the requirements of the Drinking Water Standards.

### Stopping chlorine treatment before the well head works are complete

- 5.5 The Drinking Water Assessor has been clear about the need for disinfection treatment to continue at any pump station that is being supplied with water from a bore that does not have secure status. Chlorine disinfection to mitigate the risk of contamination via the insecure well heads is documented in our Water Safety Plan.
- 5.6 If the Council decided to cease chlorine treatment at a pump station, before secure status is confirmed for the supplying wells, then it is almost certain that the Drinking Water Assessor would advise the Medical Officer of Health to direct the Council to reinstate chlorine disinfection.

- 5.7 It is also possible that the Director-General of Health would direct further action such as comprehensive chlorine treatment, including maintaining a chlorine residual throughout the reticulation, until the Water Safety Plan for the city supply has been reviewed and updated in accordance with the new framework (released in December 2018).

### Well head security improvement programme

- 5.8 The programme to accelerate the upgrade of the well heads commenced in February 2018. The preferred approach is to raise all well heads above ground and install best practise infrastructure. The physical work generally includes placing a full grout seal around the well casing; standard headworks with a two way air vent, double bellows and double check valves; electrical upgrades, sensors and a flow meter; and an impermeable plinth/apron.
- 5.9 This upgrade work significantly advances the protection of well heads from surface contamination sources, increases the resilience of the well head infrastructure and improves access for operations and maintenance activities.
- 5.10 The programme for the remediation of the well heads is being managed through a number of discrete work packages:
- 5.10.1 Two work packages have been completed – the first to complete minor remedial works on 25 above ground well heads and the second to raise and upgrade six below ground well heads.
- 5.10.2 The third and fourth work packages – to raise and upgrade a further 35 well heads – are in construction with the work planned to be completed from February through to September 2019.
- 5.10.3 The fifth work package – for interim improvements to 13 below ground well heads – is being awarded by direct appointment to a number of contractors with the work planned to be completed from March through to May 2019.
- 5.10.4 Work package six – to raise and upgrade 7 below ground well heads – is out to tender.
- 5.10.5 Works packages seven and eight to raise and upgrade the remaining well heads will go to tender later in 2019.
- 5.11 As at the 22 February 2019 there were 39 well heads where remediation works had been completed. The progress of the well head remediation programme and the number of wells at each stage from planning through to completed and 'secure' is set out in **Attachment A**.
- 5.12 The proposed work programme over the next few months is based on the anticipated demand for water, the modelled supply and the estimated number of wells that can be taken out of service in each zone. The actual progress to date and the planned progress through to October 2019 is set out in **Attachment B**. This assumes that the ultraviolet treatment at Main Pumps is commissioned in June 2019 and the well head remediation work progresses exactly according to the proposed timetable.
- 5.13 The timing for the future programme cannot be known with certainty until all of the tenders have been evaluated, the contractors confirmed and the works commenced on site. Some delays were experienced early in 2019 due to slower than expected fabrication of the well heads and a health and safety incident at the Brooklands site. We are working with the contractors to reset the forward programme and accelerate delivery where possible.

### Finances

- 5.14 The capital expenditure to date is tracking to budget with above ground well head conversions and improvements works averaging \$300,000 per well for the design, build and commissioning. The interim improvement works to below ground wells are averaging \$80,000 per well and will be managed within the budget by undertaking fewer interim upgrades.

### Meeting the 12 month deadline

- 5.15 There is reasonable confidence that 8 of our 9 water supply zones for Christchurch – West, Kainga/Brooklands, Northwest, Parklands, Rawhiti, Riccarton, Rocky, Lyttelton/Governors Bay/Diamond Harbour – can be serviced by secure wells and will be chlorine free by May 2019.
- 5.16 The challenge is in the Central water supply zone where we have the largest number of wells that require improvement works and the least spare capacity in relation to the demand for water. The Central zone is the largest water supply zone supplying approximately 42 per cent of the population. On the current programme three pump stations in the Central zone, providing approximately 10 per cent of the water for the city, would require chlorine treatment beyond the end of May 2019.
- 5.16.1 The largest of these is Main Pumps. The contract for UV at Main Pumps has been awarded, commissioning is planned for the end of June 2019 and we are in discussions with the contractor to see if this date can be brought forward.
- 5.16.2 The well head improvements at Mays pump station are planned for completion in July and at Spreydon in September 2019.
- 5.17 Modelling of the network to maximise the delivery of untreated water demonstrates that 90 per cent of the city supply could be without chlorine treatment by May 2019 (for winter demand) and 100 per cent by October 2019 (for summer demand). The modelled supply from secure wells, assuming that all of the improvement works progress according to the plan, and the number of isolated wells, is summarised in **Attachment C**.
- 5.18 There is a risk that fewer wells heads are improved and signed off as secure if there is very high water demand and/or any failure of the contractors to deliver in accordance with the timetable proposed. This could result in chlorine treatment being required at a larger number of pump stations. Staff are working closely with contractors to work through any issues that arise during the construction works and keep to the proposed timetable.

### Water conservation and water restrictions

- 5.19 The demand for water varies considerably through the day and through the seasons. The peak summer demand is approximately double that of winter. During the cooler winter months 35 pump stations are generally required for the peak hourly demand across the city. During the summer months every one of our 53 pump stations, and almost all of the operating wells, can be required to meet the peak hourly demand on warm dry days.
- 5.20 A survey of residents in 2018 indicated that most respondents would be willing to work with Council to return to unchlorinated water as soon and possible, with 71 per cent considering this to be a high priority. Most would reduce their water use over the summer months – with 78 per cent in favour of at least moderate water restrictions and 57 per cent in favour of higher level restrictions. The higher, Level 3, restrictions would allow residents to water their lawns and gardens using a hand held hose on alternate days.
- 5.21 The Council has been sending out water conservation messages using social media and community newspapers. The Press has also helpfully highlighted the issue. While the water conservation campaign has been successful in reducing the total daily demand, compared with previous years, we are still seeing a very high peak hourly demand on warm dry days.
- 5.22 A leaflet drop to increase awareness and encourage greater water conservation in the Central water supply zone will be carried out in February. If we can significantly reduce the demand for water we would be able to carry out improvement works on a larger number of wells over the next few weeks.
- 5.23 Level 3 water restrictions would send a clearer message and, from experience post-earthquakes, would be more effective in reducing demand. The introduction of water restrictions for

Christchurch city would provide greater certainty to the well head improvement programme timetable and may allow a larger number of wells to be made secure by May 2019.

### **Reducing the chlorine levels across the network**

- 5.24 The water supply network is being managed to maximise the delivery from pump stations without chlorine treatment. To date nine pump stations are fed by secure bores and have no chlorine treatment. A further four pump stations have been operated without chlorine treatment, using only secure bores, at times of low demand. As demand increased through January 2019, the isolated bores at these four pump stations have been brought back into service and the chlorine treatment reinstated.
- 5.25 The initial chlorine dose has been reduced at 21 pump stations – the dose can be reduced where we have at least two minutes contact time to the first consumer and we have plans in place to manage the potential for contamination from surface flooding. Changes are being made to the network to reduce the initial chlorine dose at a further four pump stations during February.
- 5.26 The reduction in the chlorine dose was initially driven by complaints about taste and odour from the water supply. The city has also seen an increase in the rate of hot water cylinder failure which is being linked to the chlorination of the supply. A reduction in the amount of chlorine in the network is expected to mitigate these issues.
- 5.27 The actual progress with chlorine reduction to the end of January and the planned progress to the end of May, by the number of pump stations, is set out in **Attachment D**.

### **Providing water without chlorine treatment**

- 5.28 There have been a number of people collecting water from private wells without chlorine treatment. To meet some of this demand a water collection point has been set up at the Keyes pump station in New Brighton. A second water collection point is to be installed at the Burnside pump station.

### **New framework for Water Safety Plans**

- 5.29 A Water Safety Plan is a statutory requirement and documents a public health risk-based assessment and management process to ensure a safe and secure drinking water supply. The Water Safety Plan for the city supply was approved in 2018 and is not due to be reviewed until 2023.
- 5.30 The Ministry of Health released a new framework for Water Safety Plans in December 2018 to align more closely with international best practice. This new framework strengthens the focus on preventative measures across the whole water supply system, promotes a multi barrier approach to managing risks, and supports continuous improvement.
- 5.31 Following discussions with the Drinking Water Assessor and officials from the Ministry of Health, in January this year, the Council has agreed to update its Water Safety Plans in accordance with the new framework – this includes five small supplies on Banks Peninsula, due to be reviewed between April and September 2019, and the main city supply by July 2019.

## Attachments

No.	Title	Page
A <a href="#">↓</a>	Stage gates for well head remediation	11
B <a href="#">↓</a>	Status of wells to October	12
C <a href="#">↓</a>	Modelled water supply for May and October	13
D <a href="#">↓</a>	Chlorine dose by pump station	15

## Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:

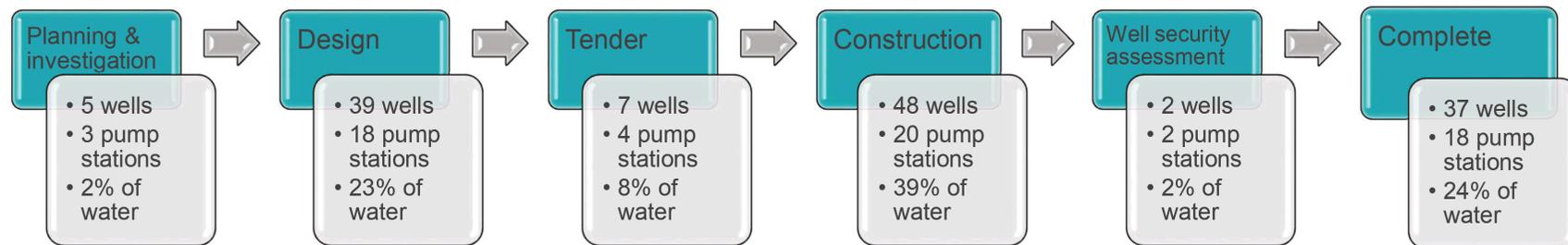
- (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
- (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

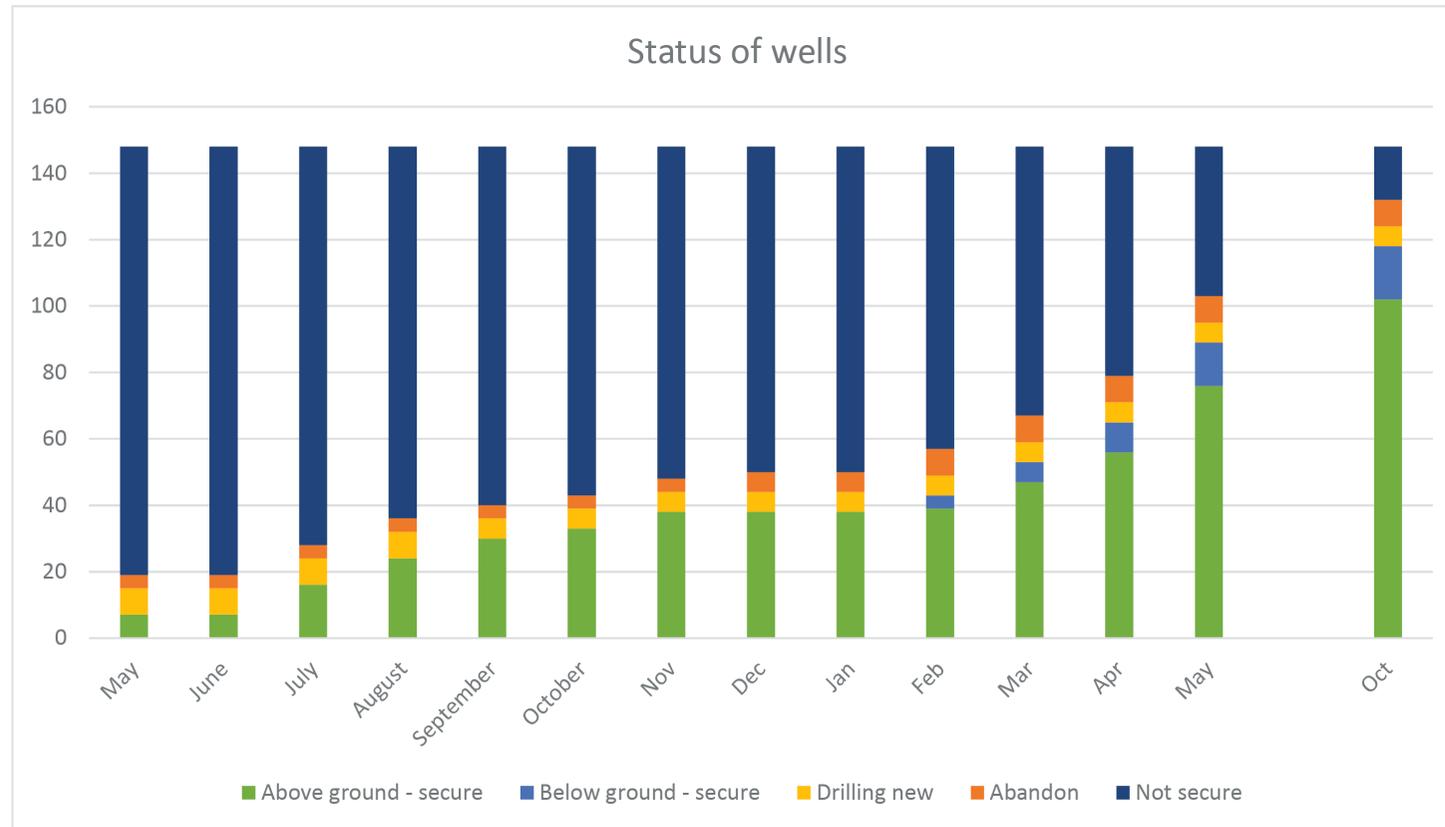
## Signatories

<b>Author</b>	Helen Beaumont - Programme Manager - Water Supply
<b>Approved By</b>	Karleen Edwards - Chief Executive

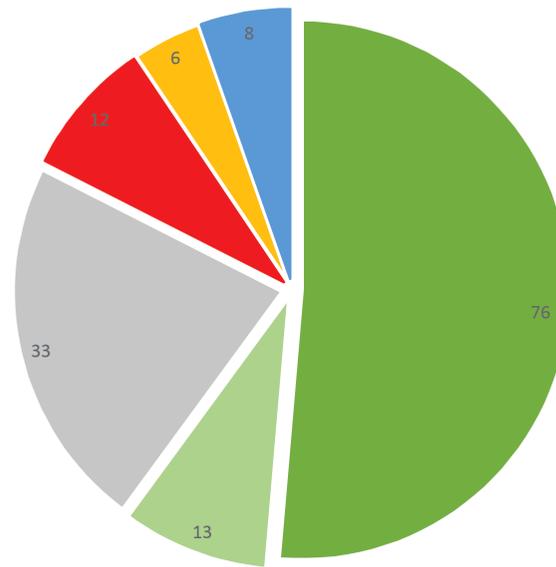
## Well head security improvement progress at 22/2/19



Plus 11 wells at 9 pump stations to be abandoned (3% of water);  
new wells to be drilled to replace capacity



Expected status of wells May 2019



■ Above ground - secure ■ Below ground - secure ■ Not secure - isolated ■ Not secure - chlorinated ■ UV ■ Drilling new well ■ Abandoned

